

Sustainable Supply Chain Management Strategies

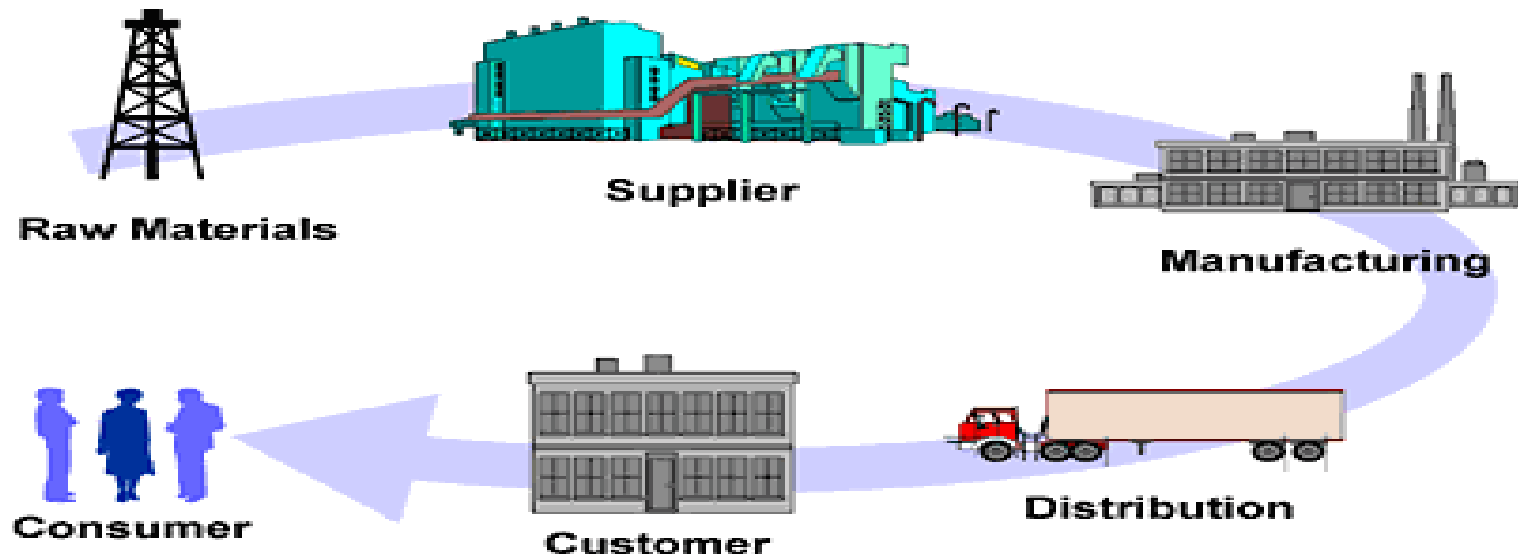
Magali Delmas
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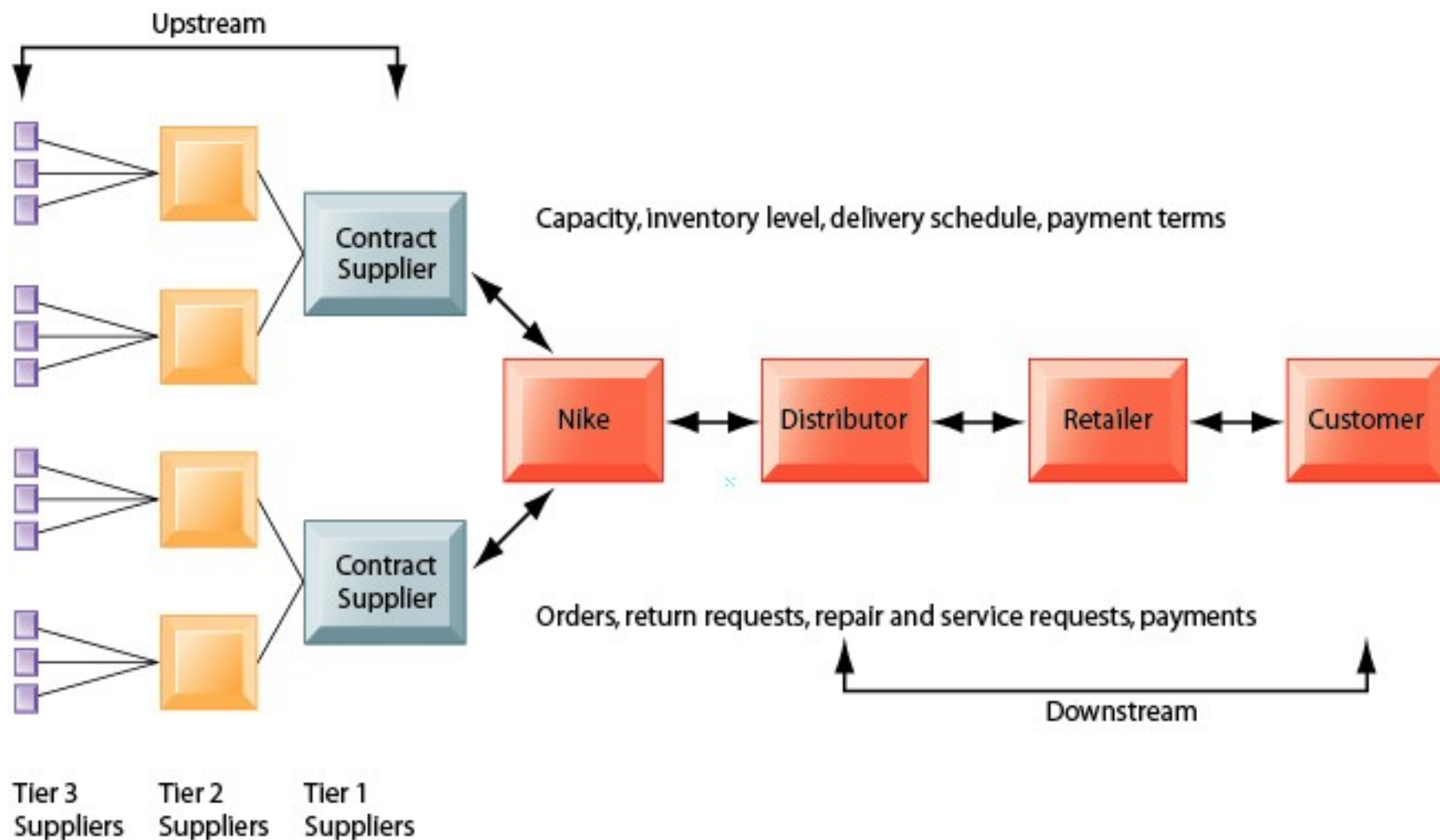
1. Supply chains & Sustainability

Sustainable Supply Chain
Management Strategies

What is the supply chain?

- The facilities, functions, and activities associated with the flow and transformation of goods and services from raw materials to the end consumer

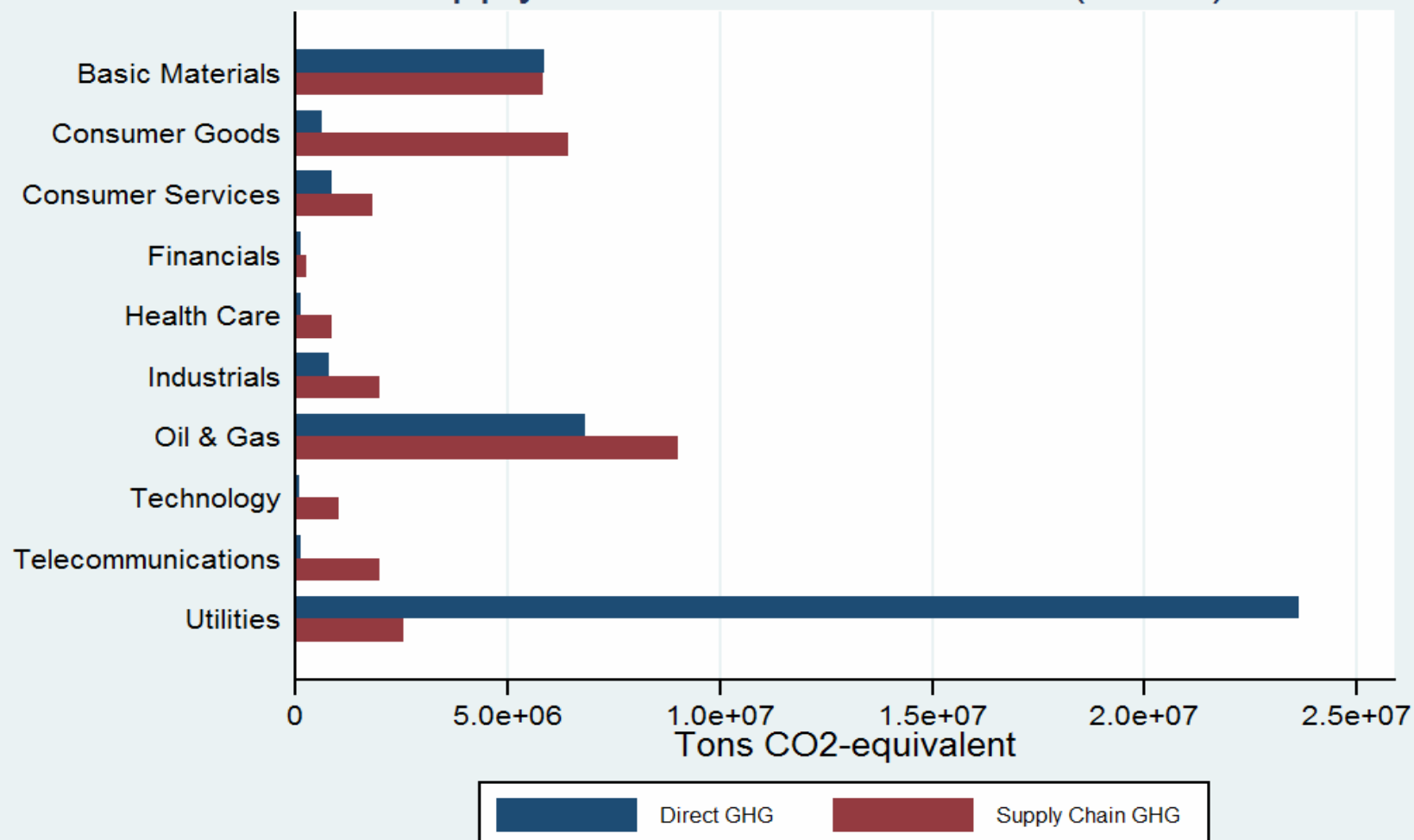


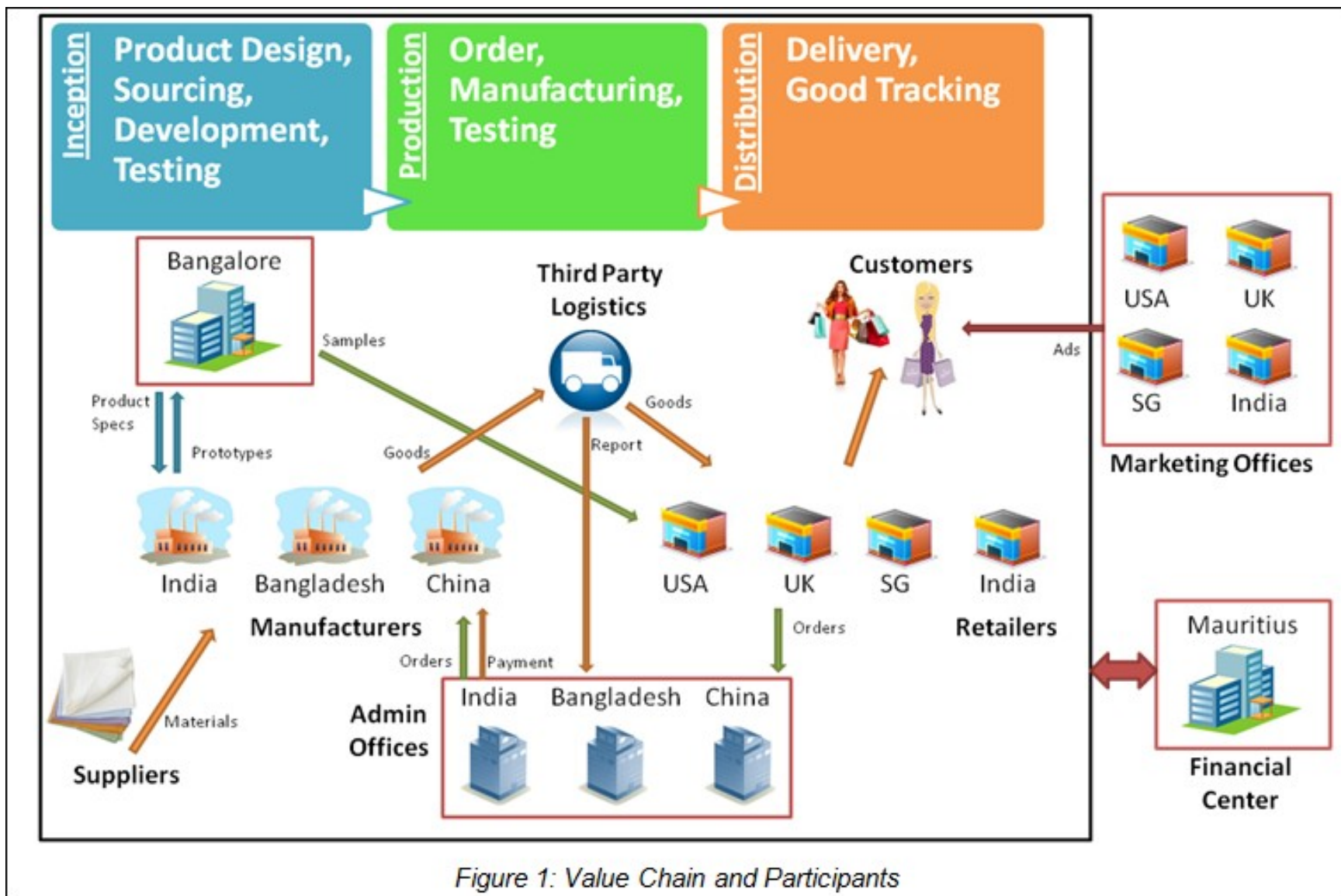


Environmental impact of the supply chain

- Supply chain emissions are often much greater than the firm direct emissions.
 - 2/3 of all hazardous waste generated by major US economic sectors ([Rosenblum et al., 2000](#)).
 - Supply chain GHG emissions are on average **5.5** times as high as a corporation's direct emissions ([CDP, 2019](#))
 - 1 gigaton of emissions could potentially be saved if 7,000 suppliers in CDP database increase their renewables purchasing by 20 percentage points

Direct and Supply Chain GHG Emissions (Mean)



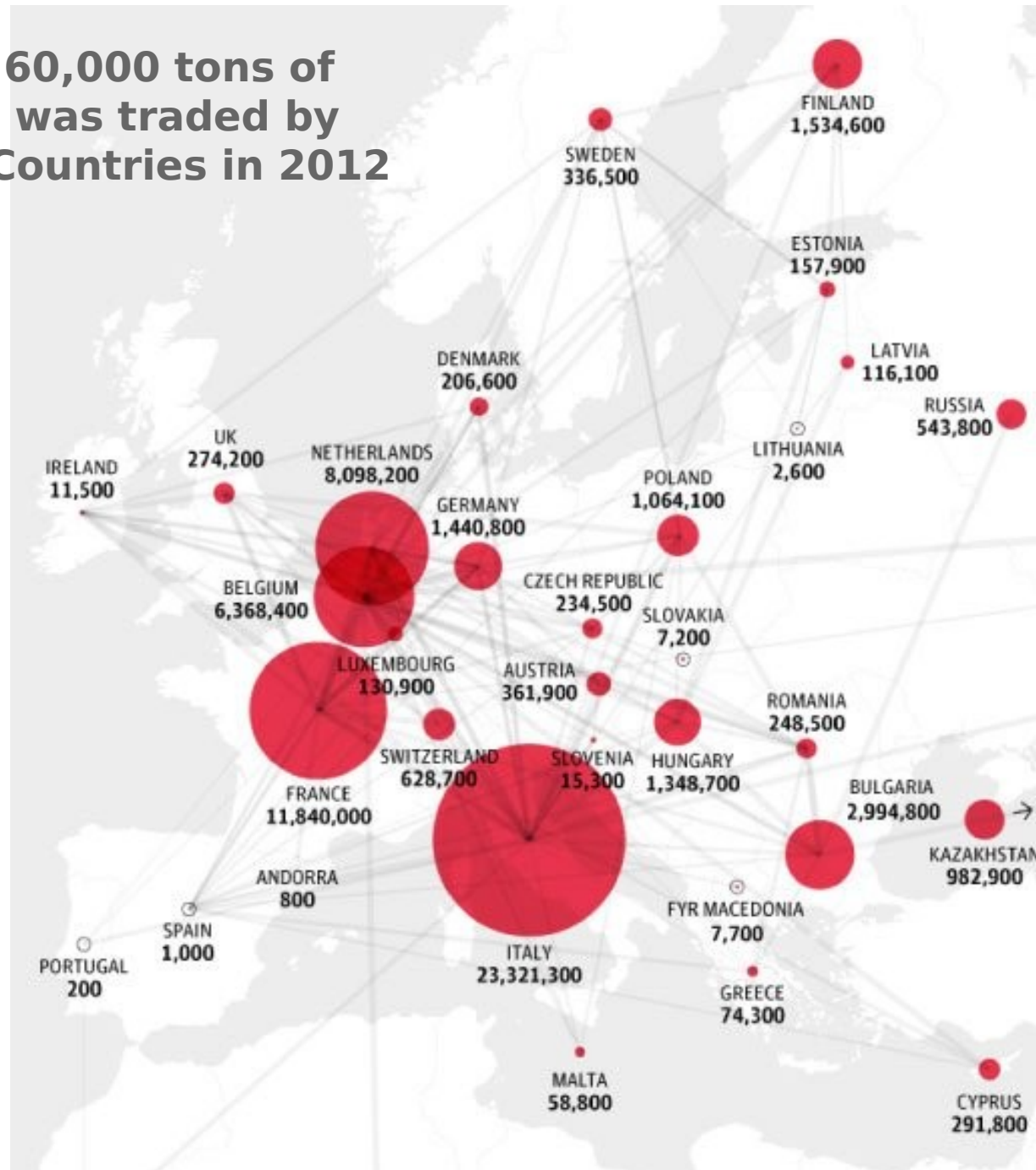


Burger King drops supplier linked to horsemeat

The Food Safety Authority of [Ireland](#) tested a range of cheap frozen beefburgers and ready meals from supermarkets for the presence of DNA from other species which were undeclared. It found horse DNA in over 30% of the beef burger samples, and pig in 85% of them.



More than 60,000 tons of horsemeat was traded by European Countries in 2012



Mattel 2007 Toxic toys...



- Mattel recalled nearly 19 million toys...
- Lead paint on toys
 - “relatively low levels of lead exposure can lead to reductions in IQ and learning disabilities and behavioral problems.” Prof Jonathan Fielding UCLA
 - 2008: Mattel and Fisher-Price agreed to pay \$12 million to 39 states to settle an investigation into the lead-tainted toys.
 - 2008: Mattel also agreed to pay a [\\$2.3 million civil penalty](#) to the Consumer Product Safety Commission for violating the lead paint ban.
 - 2009: \$50 million settlement for vouchers and cash payments to consumers.

Social impact of the supply chain

**2013 Savar building collapse in
Bangladesh: 1,129 dead**



Of the 29 brands identified as having sourced products from the Rana Plaza factories, only 9 attended meetings held in November 2013 to agree a proposal on compensation to the victims

Nestle



- Nestle attacked for its use of palm oil supplied by Indonesian palm oil giant Sinar Mas, linked to destruction of Indonesian rainforests
 - Greenpeace spearheaded a largely internet and [social-media based campaign](#) against Nestle
- In response to the campaign:
 - Nestle dropped Sinar Mas as a supplier
 - Nestle partnered with The Forest Trust to rid its supply chain of any sources involved in the destruction of rainforests

Supply Chain

- Large environmental impact
- Global
- Complex
- Fragmented
- Risky

What is supply chain management (SCM)?

- A conscious effort by the supply chain firms to develop and run supply chains in the most effective & efficient ways possible ([Handfield, 2020](#)).
- So that the product is produced and distributed
 - In the right quantities
 - To the right locations
 - At the right time
- Focus:
 - Do More (productivity)
 - With Less (financial)
 - Better (quality)
 - Faster (velocity)

What is Sustainable Supply Chain Management (SSCM)?

- Integrating ***environment & Social*** thinking into supply chain management, including
 - product design,
 - material sourcing and selection,
 - manufacturing processes,
 - delivery of the final product to the consumers,
 - and end-of-life management of the product after its useful life

The potential benefits of SSCM

- Reduce litigation risks (ex toxic chemicals)
- Assurance of supply (e.g. sustainable fish Walmart)
- Rationalize supply chain (e.g. fish Walmart)
- Improve reputation with investors and the media ([CDP](#))
- Efficiency gains (reduce packaging, Walmart)
- Access to markets (US executive order)
- Innovation (close loops)

SSCM Strategies

- 1. Information sharing systems and training modules
- 2. Performance improvements requirements
- 3. Closed loop systems

SSCM Strategies

- **1. Information sharing systems and training modules**
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1. Information sharing systems

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GSCM Strategies

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Measurement of SCM Performance

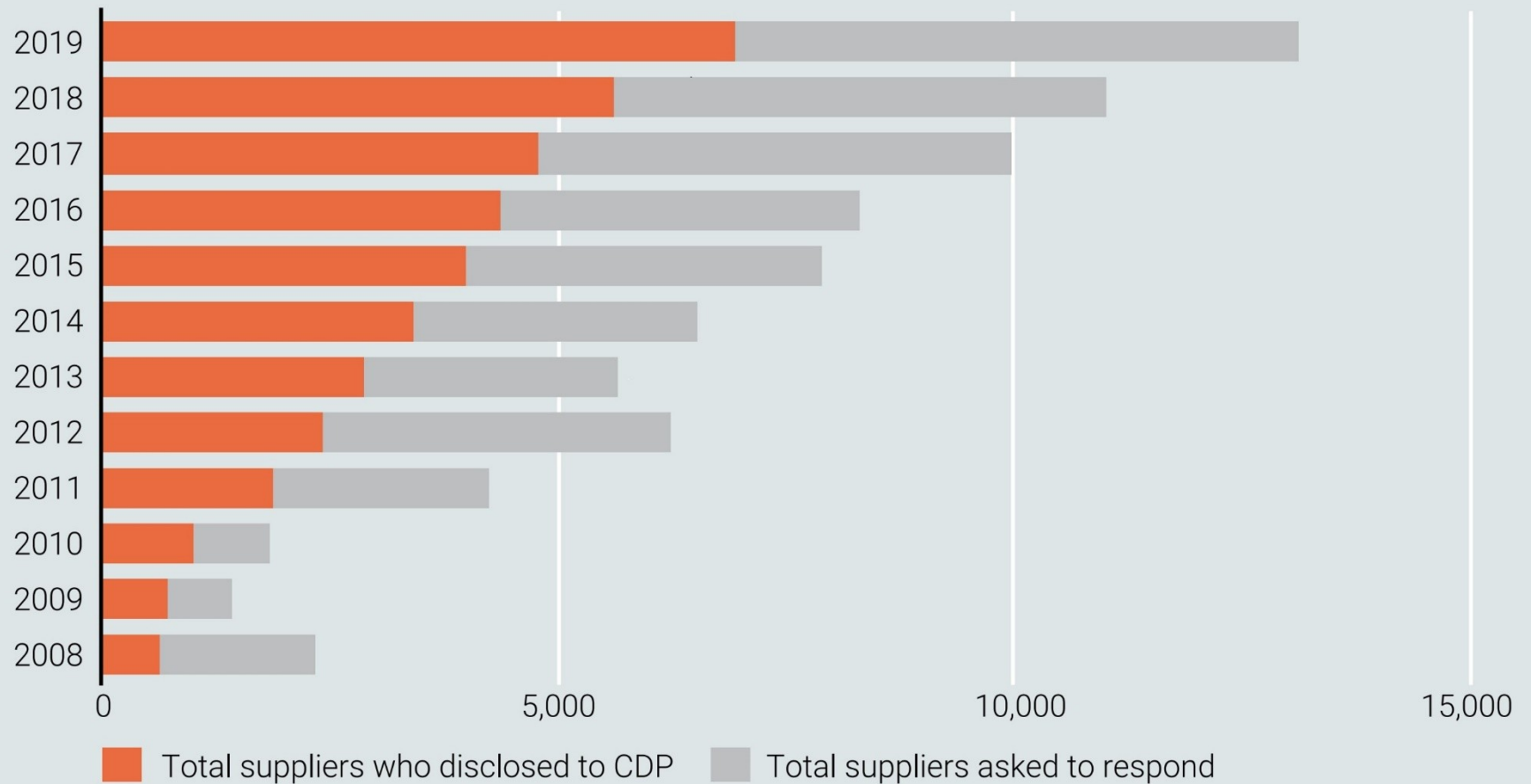
- Key performance indicators:
 - Inventory turnover
 - Cost of annual sales per inventory unit
 - Inventory days of supply
 - Total value of all items being held in inventory
 - Fill rate
 - Fraction of orders filled by a distribution center within a specific time period
- Challenge: how to incorporate environmental & social metrics into performance indicators?

PUMA's Environmental Profit and Loss Account (E P&L)

PUMA's EP&L Account

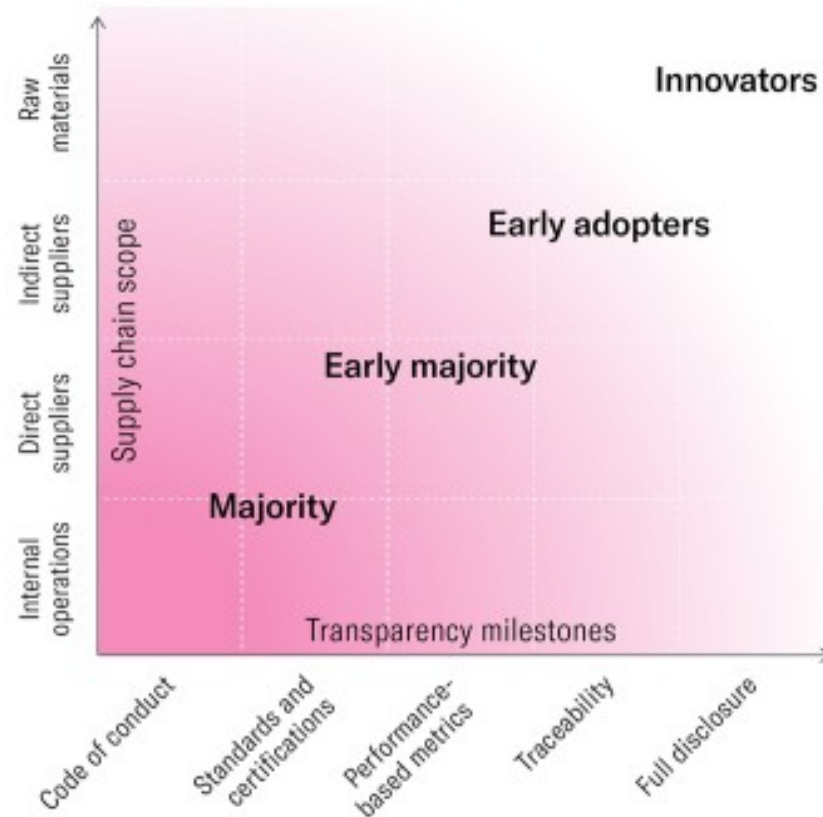
	Water use	GHGs	Land use	Air pollution	Waste	TOTAL	
	€ million	€ million	€ million	€ million	€ million	€ million	% of total
	33%	32%	26%	7%	2%	100%	
TOTAL	47	47	37	11	3	145	100%
PUMA operations	<1	7	<1	1	<1	8	6%
Tier 1 – manufacturers	1	9	<1	1	2	13	9%
Tier 2 – processors	4	7	<1	2	1	14	9%
Tier 3 – raw material processors	17	7	<1	3	<1	27	19%
Tier 4 – raw material producers	25	17	37	4	<1	83	57%
Geographic analysis							
EMEA	4	8	1	1	<1	14	10%
Americas	2	10	20	3	<1	35	24%
Asia/Pacific	41	29	16	7	3	96	66%
Segmental analysis							
Footwear	25	28	34	7	2	96	66%
Apparel	18	14	3	3	1	39	27%
Accessories	4	5	<1	1	<1	10	7%

Growth in CDP supply chain disclosures, 2008-2019



How Transparent Is Your Supply Chain?

Transparency can be measured along two dimensions: supply chain scope (the depth of your interaction in the supply chain) and milestones on the path to complete transparency. Most companies are at the majority or early majority stages.





FASHION TRANSPAREN CY INDEX

2020 EDITION

A review of 250 of the biggest global fashion brands and retailers ranked according to how much they disclose about their social and environmental policies, practices and impacts.

FASHION
REVOLUTION

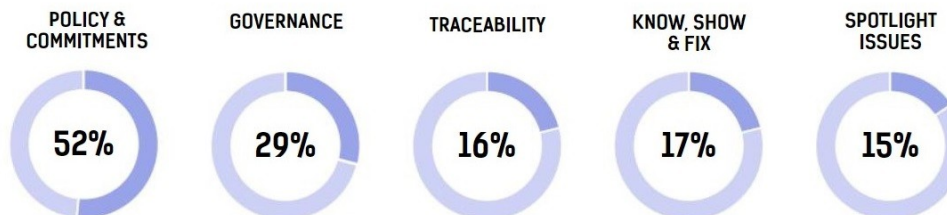
KEY FINDINGS

23% overall average score across the 250 brands reviewed

↑ Up 2 percentage points since 2019 (200 brands)

↑ Up 3 percentage points since 2017 (100 brands)

AVERAGE SCORE IN EACH SECTION



↑ TOP 10 SCORES IN 2020 (%)

H&M (H&M Group)	73%
C&A	70%
Adidas/Reebok	69%
Esprit	64%
Marks & Spencer	60%
Patagonia	60%
The North Face / Timberland / Vans / Wrangler (VF Corp)	59%
Puma	57%
ASOS	55%
Converse / Jordan / Nike (Nike Inc.)	55%

↓ LOWEST SCORING BRANDS IN 2020 (%)

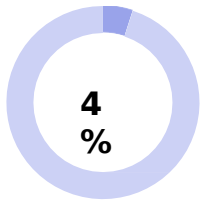
Bally	0
Belle	0
Elie Tahari	0
Heilan Home	0
Jessica Simpson	0
Max Mara	0
Mexx	0
Pepe Jeans	0
Tom Ford	0
Youngor	0

↑ TOP 10 MOVERS SINCE 2019

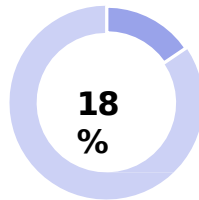
Monsoon	+23
Ermenegildo Zegna	+22
Sainsbury's-TU Clothing	+19
Dressmann	+17
ASICS	+15
Urban Outfitters / Anthropologie	+15
Clarks	+14
Pimkie	+13
River Island	+13
Russell Athletic	+13

5. SPOTLIGHT ISSUES *FINDINGS*

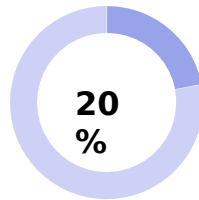
WASTE & RECYCLING



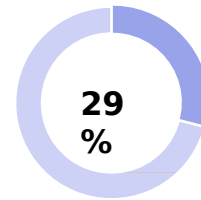
publish the amount of textile waste generated in the annual reporting period



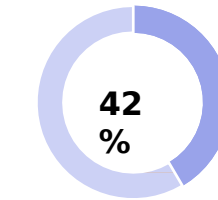
report investing in textile-to-textile recycling solutions



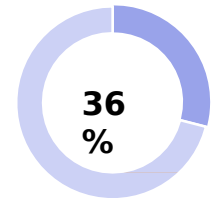
explain what the brand is doing to minimise microfibres



publish measurable progress towards reducing the use of virgin plastics

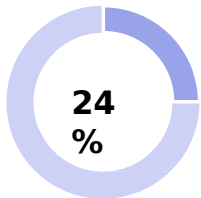


publish time-bound, measurable sustainable materials strategy

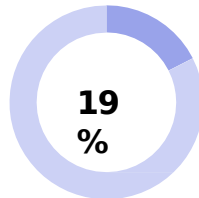


disclose progress on achieving sustainable material targets

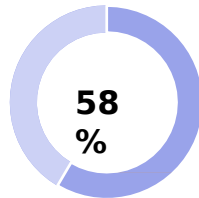
HAZARDOUS CHEMICALS



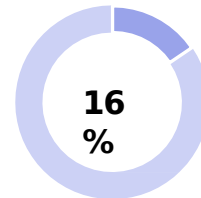
publish time-bound commitment to eliminate hazardous chemicals



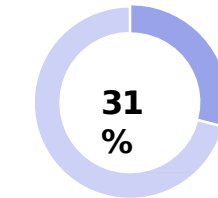
disclose progress towards this achieving commitment



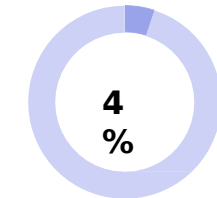
publish annual carbon footprint in company's own facilities



publish carbon footprint in company's supply chain



publish annual water footprint in company's own facilities



publish annual water footprint at raw material level

PLASTICS

SUSTAINABLE MATERIALS

CARBON EMISSIONS

WATER USE

Summary

- We observe some of the same ESG metrics for the supply chain as for the firm evaluation
- However, these metrics will have to be tailored to each of the supply chain phases
- The firm can then use these supply chain performance metrics in its overall performance
- However, we see still low response rates from suppliers

Think about this question

- Why would suppliers provide the information to their customers and reduce their footprint?
What are their incentives?

SSCM Strategies

- 1. Information sharing systems and training modules
- **Watch 2. Performance improvements requirements**
- 3. Closed loop systems

2. Performance reduction requirements

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Management Strategies

SSCM Strategies

- 1. Information sharing systems and training modules
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Sustainable Supply Chain

QUICK FACTS



Walmart and Sam's Club U.S. suppliers have improved their Sustainability Index scores by **28%** compared with 2016¹⁹



As of the end of FY2019, we achieved a supplier Sustainability Index participation rate that covers **80%** of the goods we sell in U.S. Walmart stores and Sam's Club locations for categories where the Sustainability Index is available



According to supplier reports, nearly **100%** of Walmart U.S. stores' and clubs' seafood selection is sourced in accordance with our sustainable seafood policy



1. SURVEYS DEVELOPED FOR PRODUCT CATEGORIES

Science based surveys from Walmart Sustainability indexed based on the Sustainability Consortium tools.

2. SUPPLIERS RESPOND TO SURVEYS

Suppliers may take surveys in multiple product categories.

4. PERFORMANCE & QUALIFICATIONS REASSESSED

Supplier performance is assessed annually through the Index to encourage continuous improvement.

3. SUPPLIERS AWARDED SUSTAINABILITY LEADERS BADGE

The top ranked company qualifies as an industry leader and receives a badge for every Walmart.com product in that category. In categories where there are many leading suppliers, products made

Illustrative example of how we use the Sustainability Index:

Consumables, health & wellness – top 10 supplier category scorecard

	PRIORITY CHEMICALS			PACKAGING			DEFORESTATION		INDEX
	Disclosure	Chemicals management program	Ingredient evaluations	Sustainable design	Raw material—end of life	How2Recycle Label (Y/N)	Fiber sourcing certification	Palm oil sourcing	Participation
Supplier A	●	●	●	●	●	Y	●	●	●
Supplier B	●	●	●	●	●	N	●	●	●
Supplier C	●	●	●	●	●	Y	●	N/A	●
Supplier D	●	●	●	●	●	N	●	●	●
Supplier E	●	●	N/A	●	●	Y	●	N/A	●
Supplier F	●	●	●	●	●	Y	●	●	●
Supplier G	●	●	N/A	●	●	Y	●	N/A	●
Supplier H	●	●	●	●	●	N	N/A	●	●
Supplier I	●	●	●	●	●	Y	●	●	●
Supplier J	●	●	●	●	●	N	●	●	●

Walmart Project Gigaton

- Avoid one billion metric tons (a gigaton) of greenhouse gases from the global value chain by 2030.
- How to engage suppliers?
- Call to Walmart suppliers (Watch [video](#) 3:05 mins)

Motivations for suppliers to reduce environmental impact in the Walmart case

1. Quantity commitment (e.g. organic cotton)
2. Technical assistance from environmental NGOs and Walmart (recycling, GHG)
5. Elimination of brokers and increased bargaining power (e.g. fish)

Elephants vs mice

- Different types of supply chain relationships
 - Walmart (60,000 suppliers)
 - Patagonia (90 suppliers)
- Different levels of market power
- How do these differences impact GSCM strategies?
- Can Patagonia adopt the same strategies as Walmart?

What is the role of NGOs in SSCM?

- Walmart
 - with Conservation International and Environmental Defense
- Procter & Gamble
 - with World Resources Institute (WRI), the World Business Council for Sustainable Development (WBCSD) and the Carbon Disclosure Project (CDP).
- NGOs provide
 - expertise in sustainability
 - credibility to the process

The barriers to SSCM

- How much is enough?
 - Starbucks
- Confidentiality issues
 - If transparencies on environmental performance reveals competitive and imitable attributes
- Supply chain availability limitations
 - FSC lumber and Home Depot
 - “The Home Depot will give preference to the purchase of wood and wood products originating from certified well managed forests ***wherever feasible.***”

Summary

- Firms are moving towards requesting suppliers to not only disclose sustainability metrics but also to reduce their negative impact
- This is most likely to success for bigger customers who have market power
- However, there are still other incentives for suppliers to undertake such reductions

Conclusion

- Importance of supply chain environmental impact as compared to direct impact
- Risks associated with bad management of supply chain
- SSCM strategies offer potential benefits to firms including efficiencies and innovation
- SSCM strategies are collaborative processes
- SSCM strategies need to be tailored to the firm competitive position

SSCM Strategies

- 1. Information sharing systems and training modules
- 2. Performance improvements requirements
- **3. Watch Closed loop systems**

Think about this question

- Can you find an example of Closed Loop Product?
- Ideally, it would include a zero-waste **supply chain** that completely reuses, recycles, or composts all materials.

3. Closed loop Systems

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Management Strategies

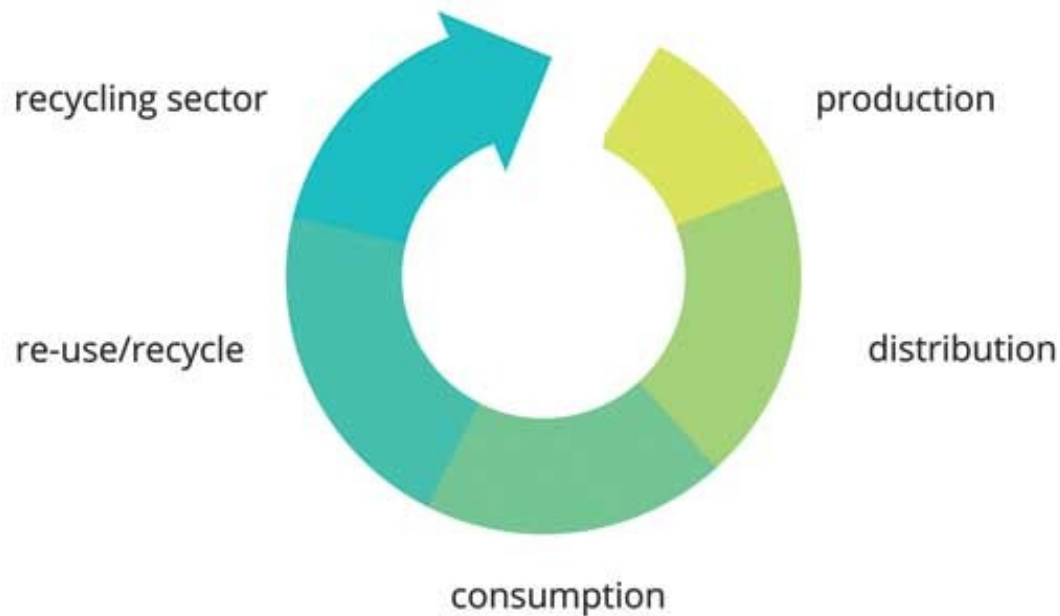
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LINEAR ECONOMY



CIRCULAR ECONOMY



Change Your Clothes for Good

Patagonia's Common Threads Recycling Program



drop it off



watch how it works



FAQ



learn more

Patagonia stores, the Patagonia Service Center and select Patagonia dealers are ready to accept it

It's Easy

Simply give us your clean, worn-out garments in one of the following ways:

- Mail them to the Patagonia Service Center at

Patagonia Service Center
ATTN: Common Threads
Recycling Program
8550 White Fir Street
Reno, NV 89523-8939

- Drop them off at the Patagonia Retail Store nearest you or at one of our Performance Baselayer Dealers.



what we take back



Patagonia recycling challenges

- Since we do not offer any incentive for people to return garments for recycling, the return rate is very low. Since 2005 recycled 6000 kg of garments
- Shipment to recycler cost about \$1.50 per kilogram, and processing cost another \$0.50 per kilogram. In addition, buying the recycled fiber usually costs 20% to 30% more than virgin fiber.
- Needs higher recycling volume and more market competition to make these programs more affordable
- For more see [Here](#)

Why are closed loop systems so difficult to implement?

1. Products need to be designed with closed loop in mind.
 2. If not, once used, the material doesn't have a sufficient market value to cover the collection
- Behavioral biases against collection. See below example with plastic

Factors	Description	Components
Knowledge	Not enough awareness or knowledge about recycling and recycling initiatives	How to recycle
		Why is it important
		How does the system work
Inconvenience	Perceptions of recycling (in)convenience	Time cost
		Perception of dirtiness
		Lack of effective facilities and/or storage space
Responsibility	Lack of a sense of personal responsibility	Lack of intrinsic motivation
		Lack of collective action ("Just me" won't make a difference)
		Lack of trust in the other actors in the system

How can these barriers be addressed?

- Knowledge barriers → *education*
- Convenience barriers → improve the logistics with *easier, more pleasant systems*
- Responsibility barriers → *clear impact (environmental, social, or personal). The system needs to be*



Case study Yoyo



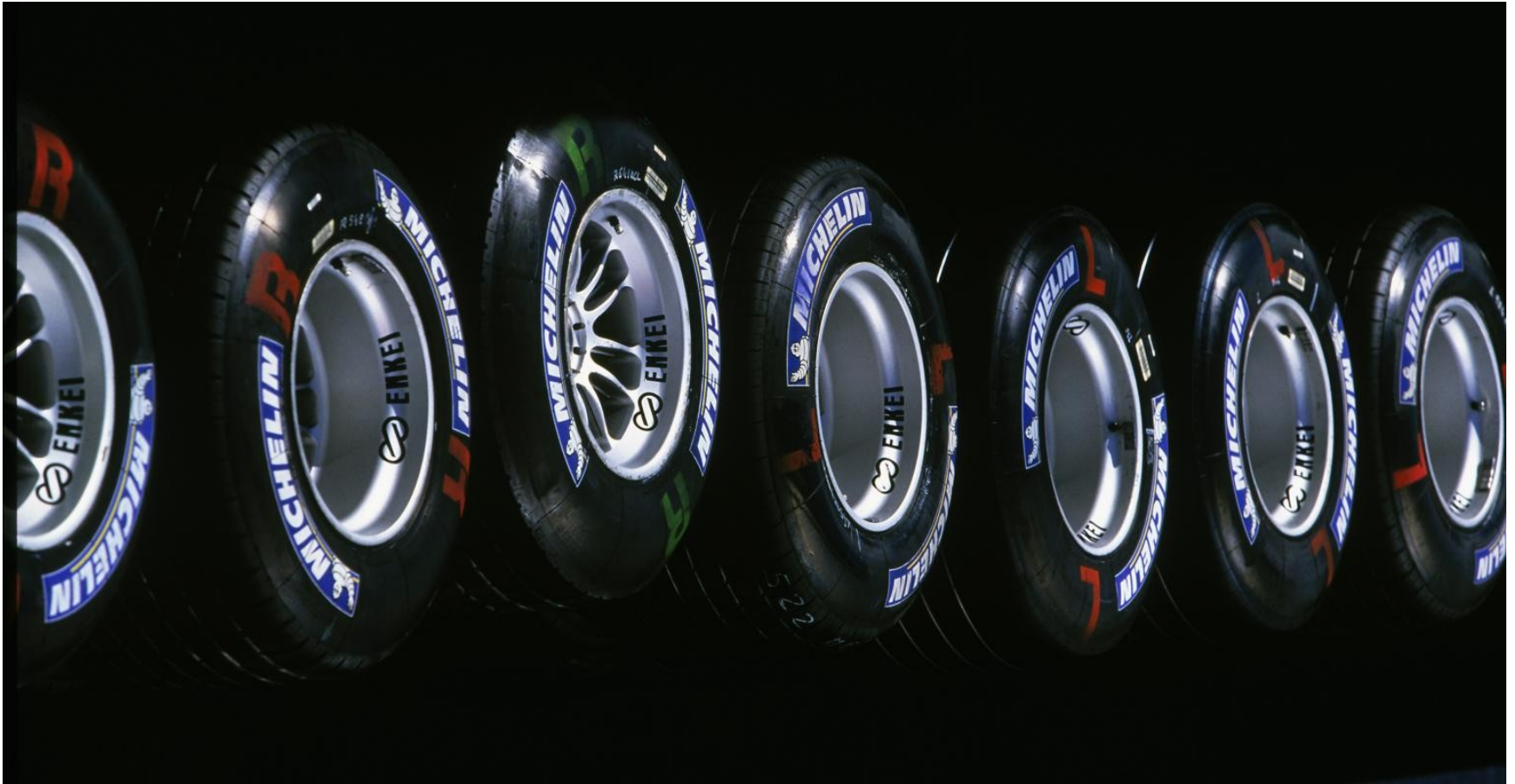
Video: [HERE](#)

Case study Yoyo



- Network of community-based Coaches and Sorters
- Sorters deliver bags with plastic bottles to Coaches
- In return Sorters accumulate points which they can exchange for rewards
- Deployment of reverse vending machines

In numbers: Founded in 2017 • In 7 major cities across France • 4,000 Coaches • 47,000 Sorters • recycled around 7.8 million plastic bottles to date

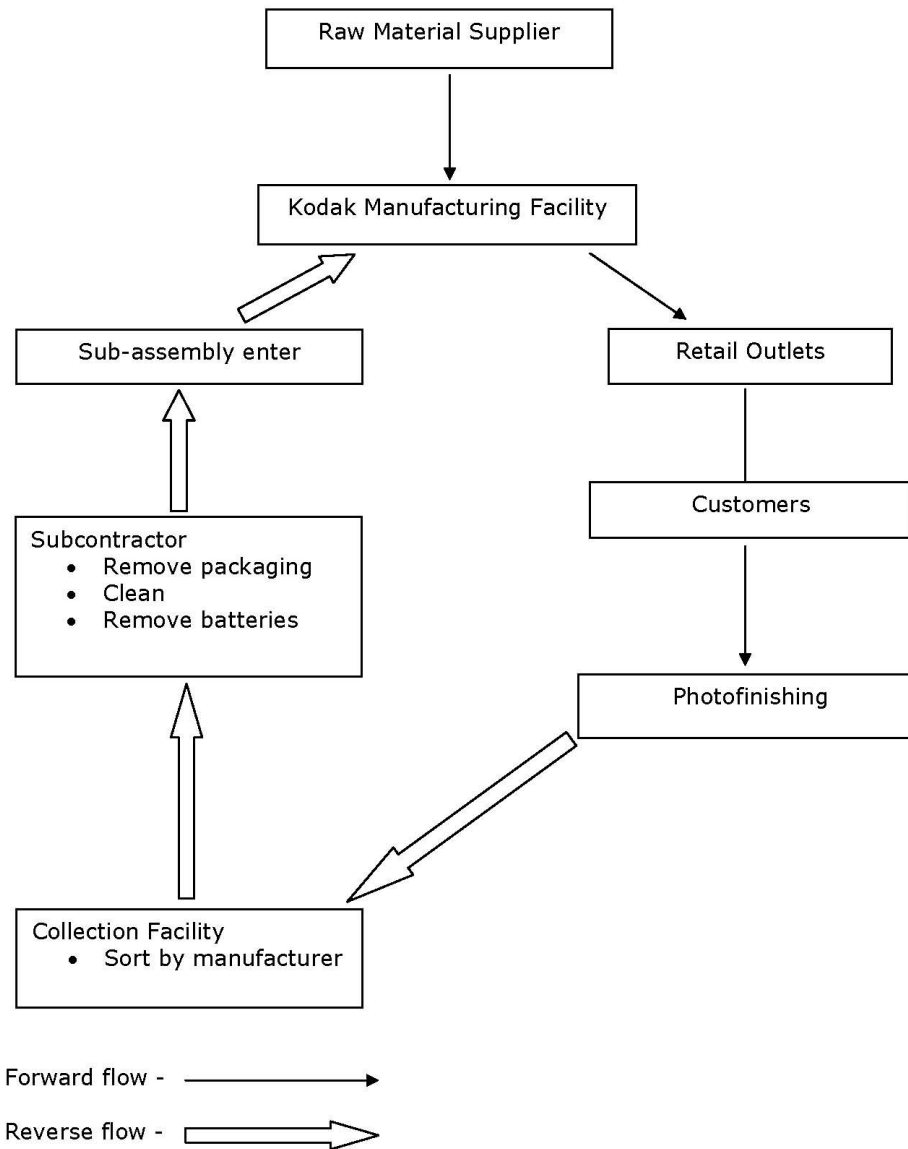


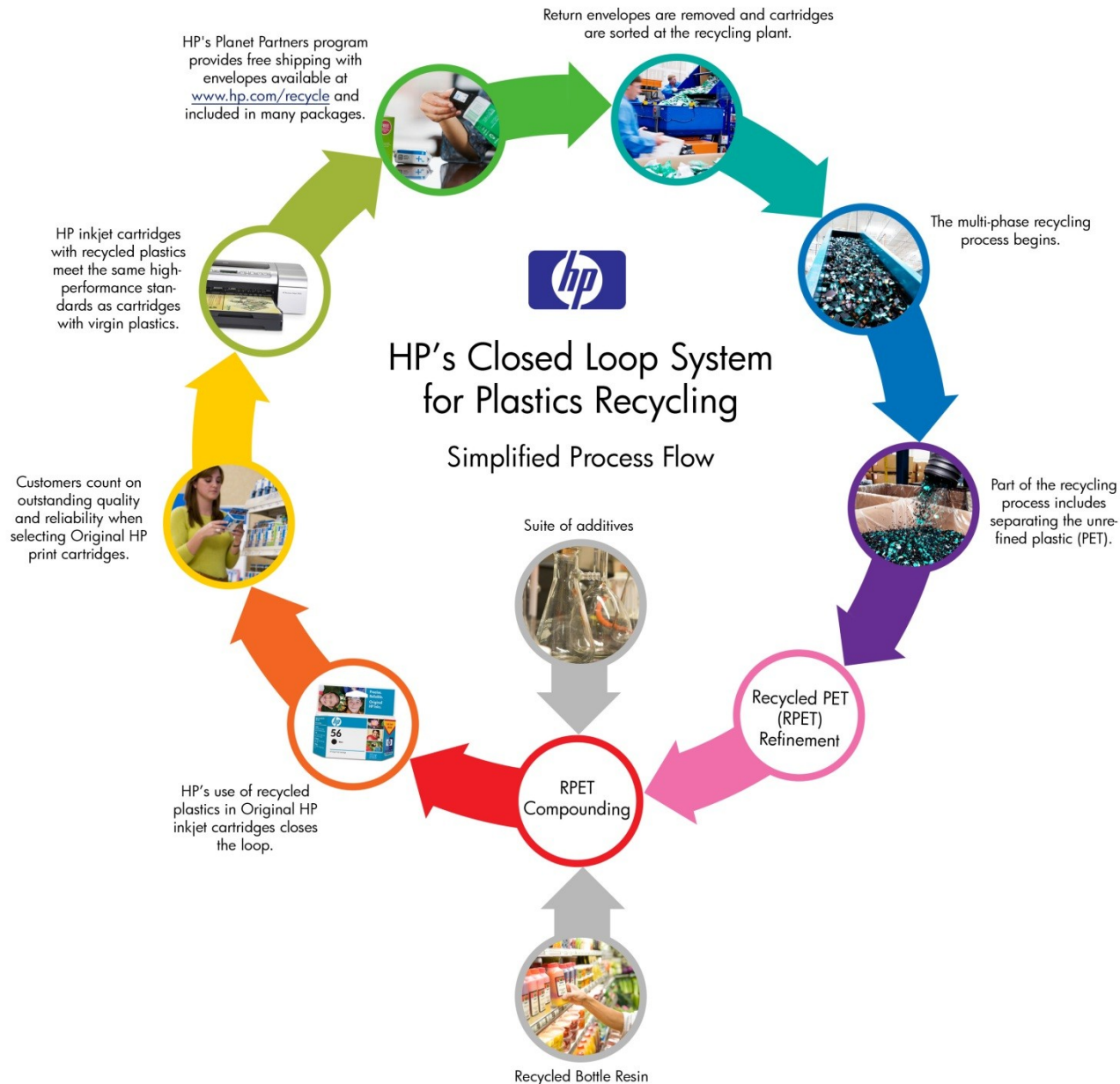
**Michelin Sets Goals to Use
80% Sustainable Materials
in Tires, Recycle All Tires by
2048**

Closed loops

- Kodak and Single use cameras
 - Remanufacturing line to the supply chain
 - 310 million single-use cameras have been returned since 1990 (Kodak, 1999; Guide, Jayaraman & Linton, 2003).
 - Kodak allocated 310 million single use cameras back into their production line.
 - Success attributed to product design (Guide et al., 2003): Kodak's single-use cameras are simple, reusable and easy to recycle, and save costs.

Kodak's Green Remanufacturing Line







- [Walmart Steps towards plastic recycling](#)

The Milkman comeback





Summary

- Sustainable Supply Chain Management System has evolved from 1. Information sharing systems and training modules to 2. Performance improvements requirements
- But the main challenges remain how to design closed loop systems for a true circular economy.
- This will require both social and technological innovation.
- And definitely need to be thought about at the product design level.

Think about these questions

- How to reduce behavioral biases towards recycling?
- How to motivate people to recycle?
- What types of technological innovations can facilitate the circular economy?

